Table 12.3 – Coal Displacement Calculation

Conversion Formula:	*Step 1*	*Capacity (A) x Capacity Factor (B) x Annual Hours (C) = Annual Electricity Generation (D)*
	Step 2	*Annual Electricity Generation (D) x Conversion Efficiency (E) = Total Output (F)*
	Step 3	*Total Output (F) / Fuel Heat Rate (G) = Quantity Fuel (H)*

Technology	**Wind**	**Geothermal**	**Biomass**	**Hydropower**	**PV**	**Solar Thermal**
(A) Capacity (kW)	8,181,033	2,189,957	6,417,795	79,103,834	168,977	440,800
(B) Capacity Factor (%)	36.0%	90.0%	80.0%	44.2%	22.5%	24.4%
(C) Annual Hours	8,760	8,760	8,760	8,760	8,760	8,760
(D) Annual Electricity Generation (kWh)	25,799,706,093	17,265,620,227	44,975,908,630	306,239,675,812	333,053,696	942,183,512
(E) Competing Heat Rate (Btu/kWh)	10,107	10,107	10,107	10,107	10,107	10,107
(F) Total Output (Btu)	260,757,629,480,278	174,503,623,632,874	454,571,508,527,161	3,095,164,403,427,280	3,366,173,705,613	9,522,648,757,289
(G) Coal Heat Rate (Btu per short ton)	20,381,000	20,381,000	20,381,000	20,381,000	20,381,000	20,381,000
(H) Coal (short tons)	12,794,153	8,562,074	22,303,690	151,865,188	165,162	467,232

Sources: Capacity: EIA, *Annual Energy Outlook 2005,* DOE/EIA-0383 (2005) (Washington, D.C., February 2005), Table A16, 2005.

Capacity factors: Hydropower calculated from EIA, Annual Energy Outlook 2005, DOE/EIA-0383 (2005) (Washington, D.C., February 2005), Table A16. All others based on DOE, Renewable Energy Technology Characterizations, EPRI TR-109496, 1997 and Program data.

Conversion Efficiency: EIA, Annual Energy Review 2003, DOE/EIA-0384(2003) (Washington, D.C., September 2004), Table A6.

Heat Rate: Annual Energy Outlook 2005, DOE/EIA-0383 (2005) (Washington, D.C., February 2005), Table H1.

Notes:

Capacity values exclude combined-heat-and-power (CHP) data but include end-use sector (industrial and commercial) non-CHP data.